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Before the  
Federal Communications Commission  
Washington, D.C. 20554

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FEDERAL COMMUNICATIONS COMMISSION  
OFFICE OF THE SECRETARY

In the Matter of )  
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Advanced Television Systems )  
and Their Impact Upon the ) MM Docket No. 87-268  
Existing Television Broadcast )  
Service )

TO: The Commission

**COMMENTS ON THE BROADCASTERS' EX PARTE SUBMISSION BASED ON  
NEW TECHNICAL DISCOVERIES TO IMPROVE  
THE DTV TABLE OF ALLOTMENTS/ASSIGNMENTS  
SUBMITTED BY  
THE ADVANCED TELEVISION TECHNOLOGY CENTER, INC.**

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**I. INTRODUCTION**

On November 20, 1997, a group of broadcasters submitted a paper urging the Commission to correct systemic problems in its DTV Table of Allotments/Assignments (the "DTV Table")<sup>1</sup> -- problems that are caused in large part by the excessive proximity of adjacent DTV channels.<sup>2</sup> The Advanced Television Technology Center, Inc. (the "ATTC") was principally responsible for identifying the DTV adjacent channel problem on which the *Broadcasters' Paper* is based. Specifically, the ATTC conducted tests in June and July

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<sup>1</sup> The DTV Table was issued in *In re Advanced Television Systems and Their Impact on the Existing Broadcast Service, Sixth Report and Order*, 7 Com Reg. (P & F) 994 (1997) at Appendix B (hereinafter, "Sixth Report and Order").

<sup>2</sup> See *Ex Parte Submission Based on New Technical Discoveries To Help the Commission Improve the DTV Table of Allotments/Assignment Submitted by the Association for Maximum Service Television, Inc. and Other Broadcasters*, MM Docket No. 87-268 (November 20, 1997) (the "Broadcasters' Paper").

showing that, under real world conditions, DTV-to-DTV adjacent channels would experience far more interference than the Commission's planning factors indicated.<sup>3</sup> If the DTV Table is not changed, more than 250 DTV stations will either cause or experience destruction of up to half of the DTV service area involved. The ATTC takes no position on specific DTV channel assignments. However, as a scientific research organization dedicated to developing and testing digital television systems, we strongly urge the Commission to reexamine its methodology for assigning DTV-to-DTV adjacent channels. If the Commission fails to reassign adjacent DTV channels to stations that are proximate but not collocated (*i.e.*, between 8 and 70 km of each other), it may inadvertently diminish the value of DTV to the public and compromise the technical quality of the system that was ten years in the making. We urge the Commission to seriously consider the *Broadcasters' Paper* and adjust the DTV Table planning factors as necessary.

## II. THE ATTC'S ROLE IN DTV DEVELOPMENT

The ATTC is a private, non-profit organization composed of equipment manufacturers, broadcasters and trade associations and located in Alexandria, Virginia.<sup>4</sup> It is the successor to the Advanced Television Test Center (the "Test Center") which was founded in 1988 to serve as the laboratory for the Advisory Committee on Advanced Television

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<sup>3</sup> See *Comment on and Opposition to Petitions for Reconsideration of the Fifth and Sixth Reports and Orders Submitted by Advanced Television Technology Center*, MM Docket No. 87-268 (July 18, 1997) (enclosing Advanced Television Technology Center, *An Evaluation of the FCC RF Mask for the Protection of DTV Signals from Adjacent Channel DTV Interference*, Document No. 97-04 (July 16, 1997)). The report was also filed by other parties.

<sup>4</sup> The ATTC's members include the broadcast companies ABC, Inc., CBS Inc., and the Public Broadcasting Service; the trade association the Association for Maximum Service Television, Inc. ("MSTV"); and the equipment manufacturing companies Mitsubishi, Matsushita (Panasonic), Pioneer, Samsung, and Sony.

Services ("ACATS") pursuant to a memorandum of understanding between the Test Center and the Commission. In this role, the Test Center was responsible for testing more than 23 competing proponents of different advanced television broadcasting systems. As a result of this testing and the decision to introduce advanced television alongside the existing analog system,<sup>5</sup> it became clear that the future of broadcast television would be digital. The ATTC tested the various components of the four digital systems that had coalesced to form the Grand Alliance.<sup>6</sup> Testing of the Grand Alliance system proceeded at the Test Center through 1994 and well into 1995. In November 1995, ACATS delivered its final report to the Commission recommending the adoption of a DTV transmission standard based on the Grand Alliance system.<sup>7</sup> The Commission adopted the recommended standard in most respects in December 1996.<sup>8</sup>

Needless to say, the Commission's DTV Table is based on technical assumptions that emerged from the ATTC testing.<sup>9</sup> For example, the predictions about DTV

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<sup>5</sup> See *In re Advanced Television Systems and Their Impact on the Existing Broadcast Service, First Report and Order*, 5 FCC Rcd. 5627, para. 7 (1990) ("[c]onsistent with our goal of ensuring excellence in ATV service, we intend to select a simulcast high definition system.").

<sup>6</sup> In mid-1993, pursuant to an ACATS recommendation, the seven companies that had been proponents of the four digital systems formed the Grand Alliance to create the optimal DTV system. See *FCC Advisory Committee on Advanced Television Service, ATV System Recommendation* (Feb. 24, 1993) available at <<http://www.atsc.org/papers/atvreport/>>. The members of the Grand Alliance are AT&T (now Lucent), David Sarnoff Research Center, General Instrument Corporation, Massachusetts Institute of Technology, Philips Electronics North America Corporation, Thomson Consumer Electronics, and Zenith Electronics Corporation.

<sup>7</sup> See *Federal Communications Commission Advisory Committee on Advanced Television Service, Advisory Committee Final Report and Recommendation* (1995).

<sup>8</sup> See *In re Advanced Television Systems and Their Impact Upon the Existing Television Broadcast Service, Fourth Report and Order*, 11 FCC Rcd. 17,771 (1996).

<sup>9</sup> See *Sixth Report and Order*, ¶193.

service coverage and interference to existing service are based on Test Center data. Similarly, the Test Center findings underlie the mileage separations between DTV adjacent channels. In allowing for regulatory review every two years during the transition to DTV, the Commission has wisely recognized the fact that the underpinnings of the DTV Table are based on a very limited amount of field testing and that the actual behavior of DTV signals in the real world may be different than predicted. We now know that the predictions of DTV-to-DTV adjacent channel interference were not at all realistic and, fortunately, the Commission has the opportunity to make the corrections before stations act in reliance on the faulty assumptions. Once the specifications of the RF Mask were released in the Sixth Report and Order, the ATTC was able to conduct tests using realistic assumptions about the out-of-band emissions that DTV signals would actually produce. The following section summarizes ATTC's findings on DTV-to-DTV adjacent channel interference.

### **III. DTV-TO-DTV ADJACENT CHANNEL INTERFERENCE**

Prior to recommending a DTV transmission standard through ACATS to the Commission, the ATTC conducted a series of tests to determine the amount of interference a DTV signal would cause to adjacent channel and co-channel NTSC and DTV signals.<sup>10</sup> However, these tests assumed ideal conditions in which there were no out-of-band emissions from the DTV channel. The Test Center knew that in the real world there would be sideband splatter but, without a definite RF mask specification to work with and with no definite idea of how DTV transmitters would be built, the Test Center could only speculate about the

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<sup>10</sup> See Advanced Television Test Center, *Record of Test Results for Digital HDTV Grand Alliance System, Part I*, submitted to the Advisory Committee on Advanced Television Services (October 1995) at I-3-14 to I-3-28 (reporting on transmission and susceptibility to interference).

extent of out-of-band emissions in the actual DTV operating environment. In 1995, this was an environment that had yet to be created through regulatory and engineering decisions.

The Commission first proposed an RF mask in 1996.<sup>11</sup> The mask focused on the protection of adjacent NTSC channels from DTV signals. In fact, both the industry and the Commission were almost exclusively focused on interference from DTV into NTSC because most experts believed that this type of interference would be the most serious, and that DTV-to-DTV interference would be fairly mild. Broadcasters reserved comment on the proposed mask until the Advanced Television Systems Committee (which was formed as part of the ACATS process), using ATTC tests, had completed work on its specifications for the appropriate mask.<sup>12</sup> The ATTC released a report on this mask in October of 1996, suggesting that the proposed mask would not be stringent enough to adequately protect adjacent NTSC channels.<sup>13</sup> Other engineering experts concurred and urged the Commission to adopt a tighter RF mask.<sup>14</sup>

Although broadcasters did not believe that DTV-to-DTV adjacent channel interference would be as severe as DTV-to-NTSC interference, they realized that the true extent of the interference was an unknown. Therefore, out of an abundance of caution, a joint

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<sup>11</sup> See *Fifth Further Notice of Proposed Rulemaking*, MM Docket No. 87-268, 11 FCC Rcd 6235 (1996), ¶ 56.

<sup>12</sup> See *Broadcasters' Comments to the Fifth Notice of Proposed Rulemaking*, MM Docket No. 87-268 (July 11, 1996) at 34 n.56.

<sup>13</sup> See *An Evaluation of the FCC Proposed RF Mask for the Protection of Adjacent Channel NTSC Signals*, Advanced Television Technology Center (October 22, 1996). Broadcasters reported these results in *Broadcasters' Comments on the Sixth Notice of Proposed Rulemaking*, MM Docket No. 87-268 (November 22, 1996) at 60.

<sup>14</sup> See *Sixth Report and Order*, ¶¶ 189-191.

broadcaster filing proposed an allotment/assignment table that minimized the number of DTV-to-DTV adjacent channel assignments in the same or neighboring communities.<sup>15</sup> The Commission used a somewhat different methodology and, for various reasons, its DTV Table contains more than 130 pairs of DTV-to-DTV adjacent channel assignments in the same or neighboring communities -- more than twice as many as were proposed in the Sixth Further Notice of Proposed Rulemaking in August 1996.<sup>16</sup> With the release of the DTV Table and actual RF mask specifications in April,<sup>17</sup> it became clear that if the RF mask did not sufficiently protect against DTV-to-DTV adjacent channel interference, the consequences for the more than 250 affected stations would be severe. It was at this point that the ATTC undertook a more thorough look at the consequences of DTV out-of-band emissions using the adopted RF mask. The ATTC released its report in July and immediately filed that report with the FCC.<sup>18</sup> In addition, MSTV alerted the Commission of the ATTC's discoveries<sup>19</sup>

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<sup>15</sup> See *Broadcasters' Comments on the Sixth Notice of Proposed Rulemaking*, MM Docket No. 87-268 (November 22, 1996) at Appendix E2.

<sup>16</sup> See *Sixth Further Notice of Proposed Rulemaking*, MM Docket No. 87-268, 11 FCC Rcd 10968 (1996), Appendix B.

<sup>17</sup> *Sixth R&O*, ¶ 195.

<sup>18</sup> See *Comment on and Opposition to Petitions for Reconsideration of the Fifth and Sixth Reports and Orders Submitted by Advanced Television Technology Center*, MM Docket No. 87-268 (July 18, 1997) (enclosing Advanced Television Technology Center, *An Evaluation of the FCC RF Mask for the Protection of DTV Signals from Adjacent Channel DTV Interference*, Document No. 97-04 (July 16, 1997)).

<sup>19</sup> See *Comment On and Opposition to Petitions for Reconsideration of the Fifth and Sixth Reports and Orders Submitted by the Association for Maximum Service Television, Inc. and the Broadcasters Caucus*, MM Docket No. 87-268 (July 18, 1997) at 29-30.

and in October submitted comments on the DTV-to-DTV adjacent channel problem.<sup>20</sup>

That testing shows that the DTV interference to adjacent channels will be *two orders of magnitude* more severe than the Test Center first measured under ideal conditions, or than the Commission assumed in constructing the DTV Table.<sup>21</sup> As a result, the Commission's predictions about many DTV service areas are overstated and DTV service will in fact be much more limited.<sup>22</sup> This finding is confirmed by technical analyses conducted in Canada.<sup>23</sup> In fact, we are aware of no reputable engineer that disputes this finding. The seriousness of the problem is compounded by the fact that, unlike DTV-to-NTSC interference, DTV-to-DTV interference will last long after the analog service is turned off. Those viewers that fail to receive DTV service because of DTV-to-DTV channel interference will likely never receive it unless the channels are separated.

The ATTC believes that the most cost effective and timely approach to resolving the DTV-to-DTV adjacent channel problem is to reassign adjacent DTV stations between 8 and 70 km by readjusting the planning factors. This correction should be done now and across the DTV Table. Changing DTV channel assignments in the major markets can only be done in a systematic way using revised planning factors. The Commission

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<sup>20</sup> See *Reply to Oppositions to Petitions for Reconsideration of the Fifth and Sixth Reports and Orders Submitted by the Association for Maximum Service Television, Inc. and the National Association of Broadcasters*, MM Docket No. 87-268 (July 31, 1997) at 3-4.

<sup>21</sup> The ATTC tests suggest that the FCC planning factors underestimate adjacent channel DTV-to-DTV interference by as much as 22 dB.

<sup>22</sup> See Appendix B to the *Broadcasters' Paper* which shows the corrected coverage and interference figures for all stations.

<sup>23</sup> See Communications Research Centre, *First Adjacent Channel DTV-DTV and DTV-NTSC Interference Calculation Using Different Channel Filters* (October 21, 1997).



requested comment on whether changes could be made on an individual basis. It may be possible to reassign DTV channels in large portions of the southwest, for example, on a case-by-case basis, but channel re-assignments in the more crowded parts of the country involve all the neighboring assignments. Thus, once the DTV Table is finalized and stations begin to build in reliance on the channel they have been assigned, it will be difficult to make changes near the coasts or Great Lakes.

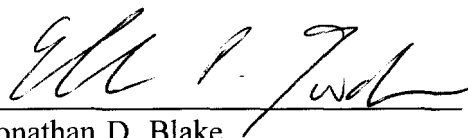
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The Commission consistently has relied upon the ATTC and its predecessor, the Test Center, to provide the technical analysis and support necessary to implement a DTV channel plan. We have now come to the conclusion that the channel plan the Commission adopted in April is based on fundamentally flawed planning factors. Unless those planning factors are changed to reflect the true nature of DTV-to-DTV adjacent channel interference as revealed by recent testing, viewers will not receive the DTV service that the Sixth Report and Order predicts for them. Changing the planning factors will result in some changes to the DTV Table, but if these changes are made systematically across the board, they need not result in significant delay or disruption.

Respectfully submitted,



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